DEPARTMENT OF ECONOMICS

WORKING PAPER SERIES

2010-06

McMASTER UNIVERSITY

Department of Economics
Kenneth Taylor Hall 426
1280 Main Street West
Hamilton, Ontario, Canada
L8S 4M4

http://www.mcmaster.ca/economics/

Hypothetical and convenience sample biases in value orientations ring games

Emmanouil Mentzakis* and Stuart Mestelman

Department of Economics, McMaster University, 1280 Main St. West, Hamilton, Ontario, L8S 4M4, Canada

Abstract

The social value orientations ring game is often used to identify behavioural types and provide insight regarding choices made by individuals in market or non-market environments. However, research on the impact of providing salient rewards to individuals making choices in the ring game is sparse. As well, the comparison of student and non-student samples with regard to social value orientations is limited. Following literature from other experimental fields, this paper is concerned with the presence of hypothetical bias (i.e. difference between subject behaviour when rewards are not salient (stated intentions) and actual subject behaviour when rewards are salient) and convenience sample bias (i.e. difference in findings of students versus non-student community subjects) in the social value orientation ring game. Looking at the social value orientation measures and their consistency, we find no evidence of hypothetical bias but significant differences when comparing student and community samples. Our findings suggest caution in generalizing value orientation results across different populations while they support the collection of value orientations at lower cost without compromising the consistency of the results.

Keywords: value orientations, hypothetical bias, convenience sample bias

JEL Classification: C91, H41

1 Introduction

Over the past 40 years, tools have been developed by psychologists to measure the social value orientations of individuals (Griesinger and Livingston Jr. 1973; Liebrand 1984; Messick and McClintock

* Corresponding author: Tel.: +1 905 525 9140 ext.24527; E-mail address: mentzak@mcmaster.ca

1968). These social value orientations are used as explanatory factors in studies where identification of behavioural types can provide insight for understanding various kinds of decisions made by individuals. Social value orientations were first introduced into the economics literature by Offerman et al. (1996) to help understand decisions to contribute resources towards the provision of public goods when the conventional economic theory does not predict provision (or cooperation). The use of social value orientations by economists has increased since their introduction to the discipline in 1996 (Brosig 2002; Buckley et al. 2001; Carpenter 2003; Kanagaretnam et al. 2009). The social value orientation categories presented in the early psychology papers (see Liebrand, 1984) are often collapsed and individual's value orientations are expressed as pro-social or pro-self. Pro-social or pro-self attitudes have been employed to explain differences among individual preferences and perceptions (Cameron et al. 1998). However, little research has focused on the incentive mechanism used to measure social value orientation and any resulting bias or whether or not there is a sample selection bias. Compensating and creating salient incentives for subjects participating in the ring game used to measure social value orientation is not universal. In some studies subjects are not paid according to their decisions in the ring game (Cameron et al. 1998; Dehue et al. 1993; Liebrand 1984) while in others, subjects are offered salient rewards (Brosig 2002; Buckley et al. 2001; Kanagaretnam et al. 2009; Offerman et al. 1996).

Following the literature of studies which use stated preference techniques, this study is concerned with the presence of hypothetical bias (i.e. the difference between the stated intentions and actual behaviour of subjects) and convenience sample bias (i.e. the difference in findings when comparing two different samples of subjects, such as students versus non-student community subjects) in the social value orientation ring game. Hypothetical bias has been observed for both contingent valuation and choice experiments using various elicitation formats and contexts (Alfnes et al. 2006; Blumenschein et al. 2008; Cummings et al. 1995; Johannesson 1999; Lusk J. L. and Schroeder 2004). Although less researched, the convenience sample bias is less apparent, with valuation studies reporting its absence (Depositario et al. 2009; Maguire et al. 2003).

Currently, there are no published studies investigating either hypothetical or convenience bias in the measurement of social value orientation, although Offerman et al. (1996) and Sonnemans et al. (1998) cite an unpublished manuscript by Offerman and Schram (1993) that reports the absence of hypothetical bias in the distribution of social value orientation measures. However, Offerman and Schram (1993) did identify a hypothetical bias in the distribution of the consistency of the decisions made by subjects. Subjects facing salient rewards were more consistent than those who did not receive salient rewards.

2 Social value orientations

The social value orientations described here are elicited through the ring game attributed to Griesinger and Livingston Jr. (1973) and Liebrand (1984). In this game an individual makes choices between pairs of income distributions. The pairs of income distributions are defined by points along the perimeter of a circle with origin at zero and whose horizontal axis identifies the subject's own payoff and whose vertical axis identifies the payoff received by a random individual with whom the subject is matched (i.e. the x and y coordinates along the circle identify the subject's income allocation and the other person's income allocation). Each subject receives a final payment equal to the total income he allocates to himself by making a series of decisions plus the total income that is allocated to him by the individual with whom he is randomly matched. Subjects do not discover how much is allocated to them by the people with whom they are matched until the all decision rounds are completed.

The ring game itself is comprised of 24 pairs of adjacent coordinates. Individuals are asked to indicate their preferred distribution of income from each of the 24 pairs of distributions. The 24 pairs lie equally spaced on the perimeter of a circle with radius r (where $x^2 + y^2 = r^2$). Adding up each subject's 24 chosen coordinates, an individual motivational vector is obtained. The location of this motivational vector provides a measure of an individual's value orientation regarding his own and the other individual's payoffs. Figure 1 presents the value orientation circle and the identified behavioural categories. Based on how individuals choose among pairs of payoff distributions between themselves and the other individual, people are characterized as Aggressive (minimizing the other's pay-off and leading to a vector whose angle relative to the horizontal axis through the origin of the circle is between -112.5 and -67.5 degrees), Competitive (maximizing the difference between own pay-off and the other's pay-off; angle between -67.5 and -22.5 degrees), Individualistic (maximizing own pay-off; angle between -22.5 and 22.5 degrees), Cooperative (maximizing joint pay-offs; angle between 22.5 and 67.5 degrees), and Altruistic (maximizing the pay-off of the other person; angle between 67.5 and 112. degrees). The ratio of the length of the resultant vector to twice the radius of the circle is a measure of the internal consistency of the subject's choices (Offerman et al. 1996).

Past research (Buckley et al. 2001) shows that value orientations obtained from ring games centered around the origin explain significant portions of voluntary contributions when compared to displaced games. At the same time, the length of the radius does not seem to alter subjects' behaviours. Hence, a ring game centred on the origin ($0, $0) with a $10 (CAD) radius was chosen. With a $10 radius (the maximum potential subject payoff is $28.28) it was deemed that the stakes were salient and dominant given the time that it would take to make the 24 decisions. Table 1, presents the series of sets of income

allocations subjects faced. To avoid ordering effects, the order of presentation of the 24 pairs was randomized. The same randomized set of choices was presented to all individuals.

3 Treatments and bias tests

To test for the presence of hypothetical and convenience sample bias, three treatments were examined. In the first, the 24-choice ring game was completed by a sample of 277 individuals from the general population of Ontario, Canada. There were no monetary incentives associated with the completion of the ring game. This was the community hypothetical (*s1)* sample. These individuals completed the ring game after completing a different survey instrument. For the other two treatments, the subjects were students of a Canadian university. All of the university students completed the same survey as the community subjects. One sample of 112 students completed the ring game after completing the survey and were not paid for this activity (the treatment was comparable to the community sample, only with students). The second sample of 110 students completed the ring game after completing the survey, but these subjects were paid for the choices that they made according to x-axis value of the motivational vector they generated plus the y-axis value of the motivational vector of another subject with whom they were randomly matched at the start of the decision-making session. The two treatments are identified as student hypothetical (*s2)* and student real (*s3)*. All treatments were computer mediated.

For comparisons among treatments two outcome measures were chosen: a) Social Value Orientation (measured as the angle of the resulting vector measured in degrees) and b) Consistency of choices (measured for each subject by the ratio of the length of motivational vector to twice the radius of the ring-game circle). Equality of means across treatments was tested by bootstrapping each sample 1000 times and each time taking the difference in the means of the two samples and testing its statistical difference from zero (Efron and Tibshirani 1993). Equality of distributions was tested through Kolmogorov-Smirnov tests (Conover 1999). Further, the presence of both biases is examined through Pearson χ^2 statistics which test for a systematic difference in the frequencies of the categories identified around the value orientation circle across the three samples. The null hypothesis is that the rows and columns in a frequency way table are independent. Rejection of the null hypothesis implies the existence of bias (Conover 1999).

Additional comparisons and tests were performed by running OLS regressions. Data from all three samples were pooled and dummy variables were included for community hypothetical and student real samples (leaving the student hypothetical as the baseline treatment). Statistical significance of the coefficients of the two sample variables would be a test of the presence of systematic differences between samples *s1* and *s2* (for convenience bias) and between samples *s2* and *s3* (for hypothetical bias).

Standard demographic information of age, sex, health status and income of participants was requested. In the regression analysis age was entered as a continuous variable (along with its squared value), sex was recorded as 1 if Male and zero otherwise and self-assessed health status was recorded as 1 if reported to be Excellent or Very Good and zero otherwise). Household income (HHinc) was recorded as 1 if income was reported as less than or equal to $100K and zero if income was reported as exceeding $100K. However, when household income was not reported, an indicator variable, incNR, was assigned the value of 1 with incNR being zero if HHinc was reported by the subject.

The convention for treating household income this way was introduced because about 20 percent of the people in our sample (99 of 499 individuals) did not report household income. The missing values were not equally spread across community and student samples (65 in *s1*; 16 in *s2*; 18 in *s3*). In order to utilize the entire sample and identify any effect that may be related to not reporting household income, we adopted the convention described above and added the interactions of incNR with the sample indicators *s1* and *s3* in the regressions to identify whether the tendency to not reporting income would be associated with the presence or absence of any biases.

When social value orientations are used as explanatory variables, some researchers have chosen to exclude observations of individuals for whom the consistency of their social value orientation measure appears to be excessive small – indicating inconsistent behaviour and therefore likely an unreliable value orientation measure. Dehue et al. (1993) excluded individuals with consistency measures below 0.20. Offerman et al. (1996), Buckely et al. (2001) and Brosig (2002) excluded subjects with consistency measures below 0.33, 0.40 and 0.25 respectively. We are reporting comparisons of treatments without dropping any subject and also after excluding the 10 percent least consistent participants (consistency values less than 0.46) and after excluding the 25 percent least consistent participants (consistency values less than 0.73). The first set of exclusions drops 40 subjects from *s1* (14 percent of the sample), 4 from *s2* (4 percent of the sample) and 6 from *s3* (5 percent of the sample). The second set of exclusions drops 89 subjects for *s1* (32 percent of the sample), 17 from *s2* (15 percent of the sample) and 10 from *s3* (9 percent of the sample).

4 Results

4.1 Equality of means and distributions using test statistics

Table 2 presents the means and standard deviations of the social value orientation measure (VO) and Consistency measure for all three samples. A mean VO of 17 to 34 degrees is observed and a mean

Consistency of about 75% or 85% depending on the sample. Smaller positive VOs for the students' samples imply they favoured coordinates that had higher payoffs for themselves and smaller payoffs for their matching individual. At the same time the community sample appears less consistent in completing the ring game. Bootstrapping the differences of the means, we find no significant difference in either VO or Consistency between the two student samples (*s2* and *s3*), but we do find differences when comparing the community hypothetical and the student hypothetical samples (*s1* and *s2*). These results are replicated when using the K-S statistic to examine the equality of the observed distributions. In short, test statistics indicate the presence of convenience sample bias but not the presence of hypothetical bias.

The frequency distributions and the corresponding percentages of the VO categories, created by defining discrete VO categories over the continuous VO variable, are presented in Table 3. Community subjects covered the entire range of categories, with higher percentages in Aggressive, Cooperative and Altruistic relative to either student sample. As before, the student VO distributions were highly comparable, with students mostly split between Individualistic and Cooperative. Formally testing the equality of distribution, as with the continuous VO previously, we reject the presence of a hypothetical bias but we cannot reject the presence of convenience sample bias.

4.2 Equality of means and distributions using regression analysis

Regression analysis fails to identify the existence of hypothetical bias (the coefficient for the *s3* variable is not statistically significant), while convenience sample bias seems to be present (the coefficient for the *s1* variable is significant) for both of the dependent variables. On average, those who chose to not report their income and those in the community sample tend to be less consistent than other individuals, although the former effect is not statistically significant. However, focusing on the community subjects, comparing those who report their income to those who do not we find that that those who report an income category are more consistent (albeit this interaction effect is weakly significant).

Excluding observations of individuals whose consistency measures are below 46%, the results regarding convenience and hypothetical biases found with the entire sample are replicated; lack of hypothetical bias and presence of convenience sample bias. As before, failing to report income is, on average, positively associated with lower consistency when we focus on the community sample. However, the size of the convenience bias in the consistency measure drops substantially. Finally, further excluding subjects from the sample (consistency lower than 73%) eliminates any differences in the consistency distributions across the three samples. However, the convenience sample bias remains for the

social VO measure. Community and student samples are clearly different in this dimension, with students being less cooperative (more individualistic) than the community sample.

5 Concluding Comments

Using a ring game centered on the origin with a radius of $10 we test for the presence of hypothetical and convenience sample biases. In short, looking at the social value orientation measures and their consistency measures, we find no evidence of a hypothetical bias. However, we find significant differences in the distributions of social value orientation and its consistency between student and community samples. It is not surprising to find different populations revealing different characteristics.

Comparing our sample's consistency with other studies using student samples, we do not find any obvious differences. Our sample consistency mean is 75% for the community and 85% for the students. However, once dropping the lower 10^{th} percentile the mean values are 83% and 89% for the respective samples and dropping the lower 25^{th} percentile the corresponding values are 89% and 92% respectively. Using financial incentives and excluding subjects with low consistency Offerman et al. (1996) found a mean consistency level of about 90%, Buckley et al. (2001) reported a value of 94% and Brosig (2002) 89%. Including financial incentives but without excluding anybody based on low consistency scores Carpenter (2003) and Kanagaretnam et al. (2009) reported levels of 87% and 90% respectively. Finally, excluding subjects due to low consistency scores but without any financial incentive, Dehue et al. (1993) reported consistency of 83%. Our results for student samples are not different from those reported by others.

Our finding of a convenience sample bias (differences between student and community samples) seems to contradict the lack of student sample bias that was reported elsewhere (Depositario et al. 2009; Maguire et al. 2003). However, the difference between the games played (the social value orientation ring game versus contingent valuation exercises) and the context that the other two studies used (willingness-to-pay values for rainforests and evaluating golden rice) might have contributed to the different results. Although the convenience sample bias of the VO measure, in our study, persists as we increase the minimum acceptable consistency measure for including an observation in the analysis, this bias disappears in the distribution of the consistency measure when the cut-off value reaches a value between 0.49 and 0.73. This suggests that there may be a level of consistency for which we can expect sample consistency to be comparable across student and community samples.

Using samples from populations of comparable consistency instils confidence that observed differences between the samples' value orientation measures are not attributable to subjects' behaviour in

playing the ring game but in true differences. Hence, our lack of hypothetical bias is an interesting addition to a minority of studies (Carlsson and Martinsson 2001) that are in contrast to a more common finding in the stated preferences literature, where creating realistic situations do, in fact, result in systematically different behaviours (Cummings et al. 1995; Lusk J. L. and Schroeder 2004). In particular, contrary to what was argued in Offerman et al. (1996), based on Offerman and Schram (1993), our comparison of student samples with and without financial reward suggests that for comparable subject samples, financial incentives may not yield more consistent social value orientation measures. Although our findings would benefit from replication, it may be argued that the social value orientation ring game may be implemented without the need for a financial incentive. This would permit collecting value orientation information at a lower cost without compromising the consistency of the data.

Acknowledgements

The authors would like to thank David Cameron, Aleksandra Gajic and Jingjing Zhang for their help in the administration of the survey and collection of the data. We are also grateful to the participants of the NET research meetings for their valuable comments and suggestions. We acknowledge financial support from the Canadian Institutes of Health Research (Grant #76670). The usual disclaimer applies.

References

Alfnes, F., Guttormsen, A. G., Steine, G., & Kolstad, K. (2006). Consumers' willingness to pay for the color of salmon: A choice experiment with real economic incentives. American Journal of Agricultural Economics, 88(4), 1050-1061.

Blumenschein, K., Blomquist, G. C., Johannesson, M., Horn, N., & Freeman, P. (2008). Eliciting willingness to pay without bias: Evidence from a field experiment. Economic Journal, 118(525), 114-137.

Brosig, J. (2002). Identifying cooperative behavior: Some experimental results in a prisoner's dilemma game. Journal of Economic Behavior & Organization, 47(3), 275-290.

Buckley, N., Chan, K., Chowhan, J., Mestelman, S., & Shehata, M. (2001). Value orientations, income and displacement effects, and voluntary contributions. Experimental Economics, 4(2), 183-195.

Cameron, L. D., Brown, P. M., & Chapman, J. G. (1998). Social value orientations and decisions to take proenvironmental Action. Journal of Applied Social Psychology, 28(8), 675-697.

Carlsson, F. & Martinsson, P. (2001). Do hypothetical and actual marginal willingness to pay differ in choice experiments? application to the valuation of the environment. Journal of Environmental Economics and Management, 41(2), 179-192.

Carpenter, J. P. (2003). Is fairness used instrumentally? evidence from sequential bargaining. Journal of Economic Psychology, 24(4), 467-489.

Conover, W. J. (1999). Practical nonparametric statistics. USA: Wiley.

Cummings, R. G., Harrison, G. W., & Rutstrom, E. E. (1995). Homegrown values and hypothetical surveys: Is the dichotomous choice approach incentive-compatible? The American Economic Review, 85(1), 260-266.

Dehue, F. M. J., McClintock, C. G., & Liebrand, W. B. G. (1993). Social value related response latencies: Unobtrusive evidence for individual differences in information processing. European Journal of Social Psychology, 23(3), 273-293.

Depositario, D. P. T., Nayga Jr., R. M., Wu, X., & Laude, T. P. (2009). Should students be used as subjects in experimental auctions? Economics Letters, 102(2), 122-124.

Efron, B. and Tibshirani, R. J. (1993). An introduction to the bootstrap. New York: Chapman & Hall.

Griesinger, D. W. & Livingston Jr., J. W. (1973). Toward a model of interpersonal motivation in experimental games. Behavioral science, 18(3), 173-188.

Johannesson, M. (1999). Calibrating hypothetical willingness to pay responses. Journal of Risk and Uncertainty, 18(1), 21-32.

Kanagaretnam, K., Mestelman, S., Nainar, K., & Shehata, M. (2009). The impact of social value orientation and risk attitudes on trust and reciprocity. Journal of Economic Psychology, 30(3), 368-380.

Liebrand, W. B. G. (1984). The effect of social motives, communication and group size on behaviour in an N-person multi-stage mixed-motive game. European Journal of Social Psychology, 14(3), 239-264.

Lusk J. L. & Schroeder, T. C. (2004). Are choice experiments incentive compatible? A test with quality differentiated beef steaks. American Journal of Agricultural Economics, 86(2), 467-482.

Maguire, K. B., Taylor, L. O., & Gurmu, S. (2003). Do students behave like adults? evidence from valuation experiments. Applied Economics Letters, 10, 753-756.

Messick, D. M. & McClintock, C. G. (1968). Motivational bases of choice in experimental games. Journal of experimental social psychology, 4(1), 1-25.

Offerman, T. & Schram, A. (1993). Selfishness, rationality and orientation re-examined: Evidence from economic and psychological experiments. Mimeo, University of Amsterdam.

Offerman, T., Sonnemans, J., & Schram, A. (1996). Value orientations, expectations and voluntary contributions in public goods. The Economic Journal, 106(437), 817-845.

Sonnemans, J., Schram, A., & Offerman, T. (1998). Public good provision and public bad prevention: The effect of framing. Journal of Economic Behavior & Organization, 34(1), 143-161.

Table 1. Pairs of payoff distributions in each combination

	Option A		Option B	
	You	Other	You	Other
1	$10.00	$0.00	$9.70	$2.60
2	$9.70	$2.60	$8.70	$5.00
3	$8.70	$5.00	$7.10	$7.10
4	$7.10	$7.10	$5.00	$8.70
5	$5.00	$8.70	$2.60	$9.70
6	$2.60	$9.70	$0.00	$10.00
7	$0.00	$10.00	-$2.60	$9.70
8	-$2.60	$9.70	-$5.00	$8.70
9	-$5.00	$8.70	-$7.10	$7.10
10	-$7.10	$7.10	-$8.70	$5.00
11	-$8.70	$5.00	-$9.70	$2.60
12	-$9.70	$2.60	-$10.00	$0.00
13	-$10.00	$0.00	-$9.70	-$2.60
14	-$9.70	-$2.60	-$8.70	-$5.00
15	-$8.70	-$5.00	-$7.10	-$7.10
16	-$7.10	-$7.10	-$5.00	-$8.70
17	-$5.00	-$8.70	-$2.60	-$9.70
18	-$2.60	-$9.70	$0.00	-$10.00
19	$0.00	-$10.00	$2.60	-$9.70
20	$2.60	-$9.70	$5.00	-$8.70
21	$5.00	-$8.70	$7.10	-$7.10
22	$7.10	-$7.10	$8.70	-$5.00
23	$8.70	-$5.00	$9.70	-$2.60
24	$9.70	-$2.60	$10.00	$0.00

Table 2. Descriptive statistics for social value orientation and consistency measures for all three samples and equality of means and distributions tests

	Community Hypothetical (s1) [a]	Student Hypothetical (s2) [a]	Student Real (s3) [a]	Equality of means [b]		Equality of distributions [c]	
				s1 vs. s2	s2 vs. s3	s1 vs. s2	s2 vs. s3
Social Value Orientation	34.01 (31.59)	22.26 (27.98)	17.12 (28.66)	11.75*** (3.78)	5.13 (3.79)	0.3155***	0.1102
Consistency	75.08 (24.95)	85.99 (17.13)	85.2 (20.06)	-10.92*** (2.22)	0.799 (2.49)	0.2362***	0.0674

[a] Sample means; Standard deviations in parentheses
[b] Bootstrapped mean differences; Standard errors in parentheses
[c] Kolmogorov-Smirnov *D* statistic
*** p<0.01, ** p<0.05, * p<0.1

Table 3. Equality of distributions of the social value orientation behavioural categories

	Community Hypothetical (s1) [a]	Student Hypothetical (s2) [a]	Student Real (s3) [a]	Equality of distributions tests
Aggressive	2	0	0	
	(0.72)	(0.00)	(0.00)	
Competitive	3	4	9	
	(1.08)	(3.57)	(8.18)	
Individualistic	72	53	50	
	(25.99)	(47.32)	(45.45)	
Cooperative	177	50	47	
	(63.90)	(44.64)	(42.73)	
Altruistic	18	2	3	
	(6.50)	(1.79)	(2.73)	
Other	5	3	1	
	(1.81)	(2.68)	(0.91)	
Total	277	112	110	
	(100.00)	(100.00)	(100.00)	
Testing all three samples *(s1 vs. s2 vs. s3)*				$\chi^2_{10} = 43.81$***
Convenience sample bias *(s1 vs. s2)*				$\chi^2_{5} = 23.65$***
Hypothetical bias test *(s2 vs. s3)*				$\chi^2_{4} = 3.29$

[a] Frequencies; Column percentages in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. OLS regression results investigating effects of not reporting income on social value orientation vector angle and consistency

	Full sample		Sample with Consistency 46% or higher		Sample with Consistency 73% or higher	
	VO	Consistency	VO	Consistency	VO	Consistency
Sex	0.0932	1.975	0.305	3.990***	0.738	1.654*
	(2.834)	(2.098)	(2.239)	(1.268)	(2.353)	(0.874)
Age	-0.555	-0.221	-0.354	-0.122	-0.272	-0.339
	(0.652)	(0.483)	(0.504)	(0.285)	(0.567)	(0.210)
Age square	0.00644	0.00392	0.00476	0.00120	0.00393	0.00342
	(0.00636)	(0.00471)	(0.00493)	(0.00279)	(0.00559)	(0.00208)
Health	-3.320	-0.876	-0.0786	-0.572	-0.216	-0.512
	(2.810)	(2.080)	(2.223)	(1.259)	(2.326)	(0.864)
HH Income <$100,000	-2.704	-0.392	-3.563	1.025	-3.382	1.445
	(3.041)	(2.252)	(2.421)	(1.371)	(2.509)	(0.932)
Income not reported (incNR)	-7.298	-4.489	-3.371	-7.291**	0.104	-1.008
	(8.280)	(6.130)	(6.233)	(3.530)	(7.068)	(2.625)
s1	13.56**	-16.48***	15.12***	-6.245**	13.70**	-1.553
	(6.669)	(4.938)	(5.166)	(2.926)	(5.504)	(2.044)
s3	-4.043	-2.361	-0.134	-0.687	0.475	0.441
	(4.415)	(3.269)	(3.397)	(1.924)	(3.435)	(1.276)
s1*incNR	1.845	11.93*	-0.462	8.295**	-3.875	4.263
	(9.328)	(6.907)	(7.099)	(4.021)	(7.953)	(2.954)
s3*incNR	-6.372	8.729	-10.08	7.569	-12.31	2.738
	(11.30)	(8.366)	(8.501)	(4.815)	(9.299)	(3.454)
Constant	35.37***	89.43***	25.84***	89.91***	23.86**	96.43***
	(11.66)	(8.630)	(8.997)	(5.095)	(10.10)	(3.751)
Observations	495	495	445	445	371	371
R^2	0.074	0.074	0.137	0.074	0.126	0.060
F - test	3.861	3.893	6.889	3.460	5.184	2.314

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

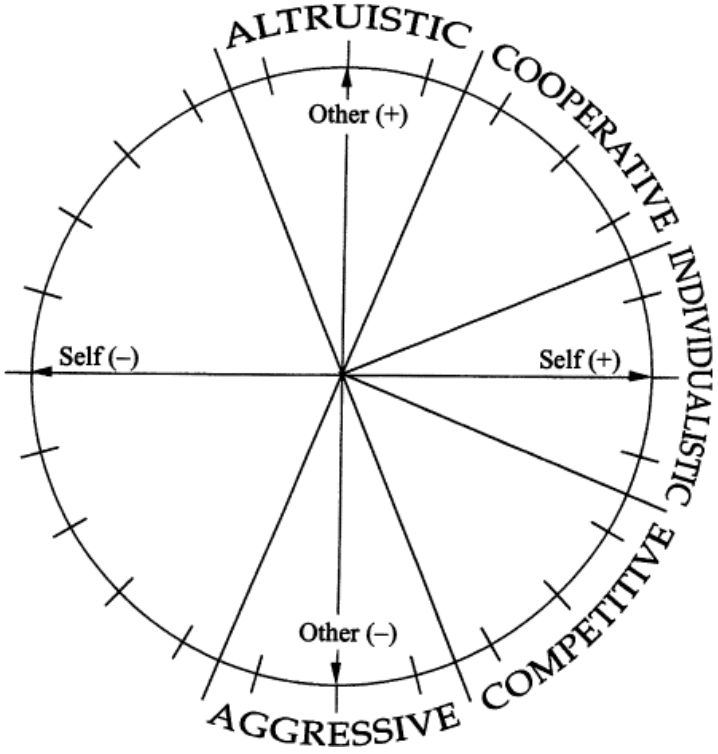

Figure 1. The value orientation circle (Offerman et al., 1996, p.823)